U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB80-103146

Urban Goods Movement

NATO Committee on the Challenges of Modern Society, Brussels (Belgium)

Prepared for

Department of Transportation, Washington, DC

Jun 78

PB80-103146

Committee on
the Challenges of
Modern Society

URBAN GOODS MOVEMENT

The NATO/CCMS
Urban Transportation Pilot Study

CCMS REPORT NO. 86

June 1978

U.S. Department of Transportation

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

The views expressed in this report are those of the authors and are not necessarily those of the governments or institutions they represent.

TECHNICAL REPORT DATA *(Please read Instructions on the reverse before completing)*		
1. REPORT NO. CCMS Report No. 86	2.	3. RECIPIENT'S ACCESSION NO. PB80-103146
4. TITLE AND SUBTITLE Urban Goods Movement		5. REPORT DATE June 1978 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Subproject of the NATO/CCMS Urban Transportation Pilot Study		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS North Atlantic Treaty Organization Committee on the Challlenges of Modern Society		13. TYPE OF REPORT AND PERIOD COVERED 14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

This study describes the problems of urban goods movement and it offers alternatives for improvements in urban goods movement.

17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES 59
	20. SECURITY CLASS *(This page)*	22. PRICE PC A04 MF A01

EPA Form 2220-1 (9-73)

TABLE OF CONTENTS

SUMMARY i

INTRODUCTION 1

TOPIC

1. Traffic Problems 4
2. Technical Problems 11
3. Urban Freight Terminals and Freight Consolidation 15
4. Effects of Commercial Custom and Regulations and of Planning Regulations 24
5. Research, Development and Demonstration 32
6. Coordination of Study Methods 44

SUMMARY: NATO/CCMS - URBAN GOODS MOVEMENT PROJECT

The NATO/CCMS "Urban Goods Movement" Project was prepared by the representatives of the U. S. A., the United Kingdom and France.

The following six topics have been studied:

(1) Traffic Problems

(2) Technical Problems

(3) Freight Terminals

(4) Regulation of Commercial Use, and Planning

(5) Demonstration of New Projects

(6) Coordination of Study Methods

Topic (1), prepared by the French, describes the nature of truck activities in cities (particularly pickup-and-delivery), and points to the differences in "the UGM problem" and "the solution" among different cities in a given country as well as among the three countries (at the time this report was prepared, the U. S. appeared most concerned with air pollution and congestion, the U. K. with noise, and the French with congestion).

Recommendations:

(i) Accept urban truck trips as inevitable and attempt to minimize their costs by incorporating them into urban transportation studies and transportation regulations.

(ii) Emphasize local solutions implemented by local authorities to solve local problems.

(iii) Make a conscious decision whether to assign priority to goods movement or to passenger movements.

(iv) Distinguish congestion created by truck movement from congestion created by trucks parking at curbside to load and unload.

(v) Develop, on the model of the English study at Swindon, traffic simulation of goods movements on real urban road networks.

Topic (2), also prepared by the French, describes the features of a desirable UGM system, i.e., routing large, through intercity vehicles around urban areas (e.g., on circumferential highways), vehicles designed especially for the urban environment (e.g., quieter, lower emissions, greater maneuverability, etc.), and automatic equipment and modern distribution techniques (e.g., use of containers and freight consolidation).

Recommendations:

(i) Give greater attention to the design needs of trucks operating exclusively in urban areas (i.e., quieter, less polluting, more energy-efficient, easier access for loading and unloading, good visibility, good traffic performance, and power equipment where necessary).

(ii) Provide training in efficient goods handling techniques to deliverymen and, if possible, to receivers.

Topic (3), prepared by the U.S. makes a strong plea for greater use of freight consolidation and coordinated pickup and delivery (e.g., along the lines of United Parcel) as a means of sharply reducing truck VMT, congestion, noise, fuel consumption and local distribution costs.

Recommendations:

(i) Make greater efforts to consolidate freight, e.g.:

- for intercity freight shipments, at city of origin, city of destination, or both;

-for urban freight trips, by route, or by a system involving consolidation terminals and coordinated pickup and delivery.

(ii) Before attempting to implement freight consolidation schemes, give careful attention to possible institutional constraints (e.g., labor regulations, willingness of shippers, carriers and receivers to cooperate, and the degree of control necessary to assure success).

Topic (4), prepared by the U.K., describes the "service first" concept which has developed in the physical distribution field (i.e., arranging displays at stores, provide insurance, credit and assistance in customs, and inventory maintenance--all at higher rates), and the implications of this philosophy for changing UGM practices and for transportation planning. This report helps explain why rationalization of expensive operations is difficult to realize.

Recommendations:

(i) Consider the needs of the owners and carriers of goods before attempting to regulate or reorganize urban goods distribution.

(ii) Strike a balance between the cost of changing the way things are done, and the benefits hoped for through change.

(iii) Treat goods movements as an explicit land use in transportation planning, particularly with respect to truck parking, exclusive bus lanes, highway capacity, and pedestrian travel.

(iv) Through existing international organizations, achieve greater harmonization of road signs and hours of operation.

(v) Improved understanding of the urban physical distribution process, particularly loading and unloading.

Topic (5), prepared by the U. S., outlines a range of alternatives to improve UGM efficiency in the near term, intermediate range, and the long run.

Recommendations:

(i) Short-range improvements (1 year or less), e.g.:

-prepaid shipments

-dial-a-truck

-route consolidation

-rescheduling pickup and delivery

-economic incentives (road pricing and parking charges)

(ii) Intermediate range improvements (1-3 years), e.g.:

-consolidated pickup and delivery

-better use of containers

-simplified documentation

(iii) Long-range improvements (3-5 years or more), e.g.:

-improved design of cities

-improved design of buildings

-improved design of vehicles

-new transportation systems (e.g., pipelines)

-greater use of communications technology

(iv) Greater international cooperation in urban goods movement RD&D.

Topic (6), also prepared by the U.K., describes some of the methodological issues concerned with measuring and analyzing UGM for purposes of freight transportation planning (e.g., commodity classification and vehicle description).

Recommendations:

(i) To improve transportation planning, attempt to achieve greater uniformity among countries in commodity and vehicle classification.

(ii) Seek greater international harmony in commercial law and regulation.

NATO/CCMS - URBAN GOODS MOVEMENT PROJECT

INTRODUCTION

The NATO/CCMS "Urban Goods Movement" Project forms the subject of the enclosed Report written by the Representatives of the U.S.A., U.K. and France.

The following six topics have been studied:

1) Traffic Problems (Fr.)
2) Technical Problems (Fr.)
3) Freight Terminals (U.S.)
4) Regulation of Commercial Use, and Planning (U.K.)
5) Demonstration of New Projects (U.S.)
6) Coordination of Study Methods (U.K.)

The first two topics concern the present situation: goods movement on urban roads is becoming increasingly difficult, and creates congestion and nuisances; the second topic highlights certain technical aspects of present delivery problems.

The third and fourth topics belong together, Topic 3 studying the frequently recommended solution of local urban freight consolidation terminals, whereas Topic 4 stresses certain commercial, social or town planning aspects which are sometimes contradictory to the purely economic aspect of terminal systems (and more

particularly to any "rational" delivery system). Combining the two topics helps explain why rationalization of expensive operations is difficult to achieve.

The last two topics deal with the question in a more general manner. Topic 5 summarizes alternatives for obtaining substantial short, medium or long-term improvements in urban goods movement. Topic 6 suggests means to classify commodities and vehicles for purposes of transportation planning, and suggests that CCMS members seek to achieve greater commonality in classification schemes and commercial law and regulation.

Let us finally draw attention to the fact that this project was launched before the "energy crisis", which makes its utility still more evident and underscores the importance of mutual cooperation. In this context, the Report on Topic 5 concludes:

> "The energy shortage is presently exerting strong pressures on carriers to come up with modes of providing local freight services with smaller expenditures of fuel. Cities probably will not be able to implement ambitious consolidation programs within a time frame which will materially relieve the present crisis (assuming it is a short-run crisis). However the long-run implications of the energy picture appear to require a much greater degree of consolidation if we are to approximate our present levels of urban

freight transport services. Now would appear to be the time for the CCMS members to undertake some bold initiatives and develop methodologies which may be shared with other countries. Hopefully, we can learn from one another."

A - Topic I - TRAFFIC PROBLEMS

A1 - Traffic Generation by Goods Movement

I-1 - Urban activities, whatever they may be, entail the placing of all sorts of goods at the disposal of the townsman, The use of heavy transport modes --rail, water, and pipe-lines--is limited by the scattering of receivers and the small quantities they ask for. So it is essentially by motor vehicles that goods movement takes place; and it is consequently not astonishing that the percentage of lorries in urban traffic is larger than the percentages of lorries recorded on country roads.

In general, there is no possibility of substituting for goods vehicles line haul transport systems like those for public passenger transport. We must accept the presence of lorries in town, take them into account in all studies and regulations, and limit their disadvantages without forgetting that goods movement is an imperious economic need which should take place at a cost that is not excessive.

I-2 - For the observer or traffic engineer who takes an interest only in vehicles, it is most often impossible to distinguish the economic activities which justify the traffic or parking of a lorry. But it is more necessary in town than in the open country to know the motives and conditions of vehicles use:

demand for traffic on urban roads depends upon demand for goods movement and is not a primary demand.

Lorry traffic corresponds to different types of goods movement, among which we can distinguish urban transit, outgoing and incoming traffic, and finally the most complex traffic streams within the built-up area. Among these industrial streams, travel by craftsmen or service trips do not have the same characteristics as goods delivery for trade. Their consequences for traffic, the foreseeable traffic control measures and the effects are different: lorry traffic and the urban economy are linked. Each town, as a consequence of its complex historical development or the town planner's desire, has its own problems, and there is no general solution to the problem of urban goods movement. So we should favour as much as possible the awareness, study and solution of problems by local authorities. The complexity of these problems grows with the size of the towns, and relatively small built-up areas (100,000 inhabitants) can more easily serve as the framework of studies and experiments.

I-3 - In general, the utilization of vehicle capacity is poor, and generated truck traffic seems to be exaggeratedly large compared to the volume of goods to carry. We should not forget

that, on one hand, it is difficult in town to get sufficient information in order to organize correctly delivery trips which are extremely variable in time. On the other hand, goods movement—even delivery--is often accompanied by commercial or technical operations during which the vehicles are poorly utilized. As the weight of goods to be carried is variable, it often happens that heavier vehicles predominate. Even though this is not very efficient, the larger capacity is necessary for more massive but irregular goods movement. Freight consolidation with a minimum of cost and mileage does not necessarily imply a full service from the transport system.

A-II - Nuisances due to traffic

II-1 - Lorry traffic, as well as passenger car traffic, creates nuisances, some of which are specific for lorry traffic or considered to be so by road users. These nuisances are traffic congestion, noise and air pollution.

Traffic noise and air pollution concern the whole population of a town. As far as lorries in town are concerned, this phenomenon has been rarely studied and little is known. Since nuisance depends upon the socio-economic context, we should attach less importance to the overall phenomenon than to the study of particular situations of the lorry in the daily work (which may not be much help to the decision-maker). Each situation creates specific nuisances: delivery vehicles

make little noise themselves, but handling devices may be noisy (flour, cement, dump trucks). . . . In normal traffic Diesel engine vehicles are low-polluting (but sometimes noisier), and the assessment and reduction of these nuisances depend upon the same techniques as for passenger cars. It is possible that substantial progress will be made in the development of an urban delivery vehicle which makes limited trips from fixed stations as soon as a non-polluting engine with satisfactory performance is available.

II-2-Traffic congestion is strongly felt by other vehicle drivers. One should distinguish two phenomena: congestion due to traffic, and congestion due to parked lorries.

The first type of congestion is caused by all lorry trips, including lorry transit. We know little about its real intensity because passenger car equivalents cannot be applied to constraint phenomena as they can to traffic volumes. It would be interesting to develop, on the model of the English study on Swindon, traffic simulation of real urban road networks. This type of congestion can be reduced by separating freight from passenger traffic spatially (e.g., by restricting trucks to certain routes) or by action on the vehicles whose driving characteristics in urban areas should

be brought closer to those of passenger cars, and by action on delivery organization (freight consolidation, geographic specialization, etc. . .), whose limits will, however, be rapidly attained in the larger context of urban activities.

Finally, there remains the frequently used weapon of restrictions of the use of the street network by lorries to certain hours, which is an efficient weapon if surveillance is effective but an expensive alternative if it entails excessive complication of urban transport operations.

Traffic congestion involves people movement (pedestrians, private autos, taxis and buses) as well as goods movements. The fundamental question that the responsible authorities should answer before taking any action is: which type of traffic should have priority?

In some countries (France), traffic congestion due to parking is considered as particularly constraining when it is due to parked delivering vehicles. In fact, it is not the same thing in other countries (England) where the priority given to Public Transport and Urban Goods Movement has resulted in a coherent and efficient policy of "no parking" of passenger cars. On the contrary, giving lorry drivers parking priority is very strongly disapproved by other road users.

Let us finally draw the attention to the interaction between urban goods movement and pedestrian activities. It seems as though direct conflicts are rare, but that pedestrians walking on narrow footpaths are in unreasoned fear of lorries passing very close to them.

II-3-Parking policy in general and its relation to delivery scheduling in particular are of course the key to the congestion problem. Nevertheless, other actions can be effective:

1) Development and adoption of improved handling techniques;
2) Adaptation of the buildings of receivers and their accesses to delivery needs. This aspect is too often neglected. Old districts raise very difficult problems. .
3) Elimination or, if possible, taxation of delivery operations which tie up vehicles for inordinate periods of time.

Lorry traffic in town is a necessity. Its study and regulation cannot be dissociated from other vehicle traffic, and it is most important that it be taken into account from the very beginning in traffic surveys and in development of measures to facilitate passenger transport. The insurmountable difficulties met in the creation of bus lanes without having studied first the pickup and delivery problems are an example.

To conclude, it is interesting to note that the national experts of the CCMS have not given the same importance to the different nuisance and traffic problems: for the American expert, air pollution, for the English expert, noise, and for the French expert, traffic congestion formed the subjects of their principal preoccupations. This is probably the proof that, globally, urban goods movement, the problems it raises and the solutions we are seeking, are dependent upon general socio-economical phenomena which should be analyzed in more depth. If the American is concerned by air pollution problems, it is because of the intensive development of the preeminently polluting engine of the passenger car, is it not (and because the relatively low cost of petrol has not led to the development of the less polluting diesel engine used in Europe)? And if the Frenchman thinks of traffic congestion while the Englishman thinks of traffic noise, would not the reason for that be that the loose and continued urban and semi-rural texture in England entails the omnipresence of transit lorries in a relatively calm universe, while the high density of French cities imposes particular attention to traffic congestion problems?

B - Topic 2: TECHNICAL PROBLEMS

B1 - The Vehicle

In order to satisfy all the different needs of a town, all types of vehicles need to be permitted to enter and circulate for delivery (except for very big vehicles for long distance freight transport, whose passing through town should be avoided as much as possible).

Purely urban vehicles should have the following characteristics:

a - Reduced nuisances (particularly noise)*

b - Maneuverability (regulation should not suppress the use of semi-trailers).

c - Power and acceleration performances in order to reduce traffic congestion at traffic signals. On the other hand, the vehicle may have its speed limited.

Vehicle equipment depends upon the goods to be carried and work to be done.

For delivery:

1) The driver's cabin should be conceived so as to facilitate the driving delivery-man and his safety, which entails:

---

* R&D programs for less polluting and quieter commercial vehicles exist already, some in liaison with the CCMS.

- a low driver's cockpit (to reduce delivery-man's fatigue), a flat and unemcumbered floor (for easy entering from the two sides),
- sliding doors,
- big windows and vehicle handling scuttles,
- a lighted desk and record file.

(1) R&D programs for less polluting and noisy commercial vehicles exist already, some in liaison with the CCMS.

(2) The body of the vehicle should have:

- except on the platform, sufficient light, either natural or artifical,
- doors which do not increase the dimensions of the vehicle when opened (sliding side doors, back door with remote-controlled curtain).

(3) In the case of manual delivery, for lorries with a maximum carrying capacity of 2 metric tons, it is preferable:

- to have a low floor (0.50m or 20 in. except for fluids: 1.15m or 45 in.),
- to have a driver's cabin which communicates with the vehicle body,
- to be able to move around freely (height) in the vehicle body.

(4) Mechanized or semi-mechanized delivery: the vehicles should have enough power to operate the handling devices. Particularly, the economic use of a back door with a lift entails the adoption

of lorries with a carrying capacity of at least 4 metric tons.

(5) In a very general way, the adoption of vehicles designed for particular goods will be facilitated by the concentration of specialized delivery agencies.

(6) It appears that there would be little to be gained from vehicle equipment designed especially for the handling of small parcels. On the contrary, the adoption of devices on the vehicle (back doors with lifts, cranes) for load units should be the best way to facilitate pickup and delivery operations.

B-II-Handling techniques

The only problem which urban goods movements do not have in common with other urban transport functions is curbside pickup and delivery.

- In this case, one will always have to proceed to manual delivery for freight transport of small quantities (less than 50 kg or 110 lbs per delivery);

- Between 50 and 150 kg (110 to 330 lbs), the most rapid and economic delivery (in France) requires the use of hand-trucks (or other similar devices);

- From 150 to about 400 kg (330 to 800 lbs), delivery by back door lifts and rolling load units (rolls, containers, etc.) should be developed rather than use of containers;

- Above 400 kg it is the back door and pallets or ordinary small containers which are the most interesting devices. The use of cranes on the vehicles is necessary in special cases.

Handling techniques to be used are broadly connected to goods packaging and the way in which they have been prepared before delivery (order preparation). In many cases, special care (glass) or supplementary operations (setting) require the use of special technical means and specialized teams.

In any case, training of deliverymen is indispensable, and desirable for the receiver.

TOPIC 3: URBAN FREIGHT TERMINALS AND FREIGHT CONSOLIDATION

INTRODUCTION

As countries become increasingly industrialized, progressively greater proportions of their populations live in urban areas. One of the consequences is that intraurban freight transport becomes a major industry. In the U.S., for example, it now accounts for approximately half the total domestic freight bill. Since every intercity shipment originates and terminates in an urban area, the urban movement of goods must be recognized as a major use of economic resources, and a strong determinant of urban transportation systems and terminal requirements, and of urban form. The origins and destinations of freight are dispersed throughout the urban area (theoretically, every industrial, commercial and residential unit), with only very few capable of being served by water, rail, or pipeline. Consequently the motor truck is the dominant mode. In the New York City metropolitan area, for example, it accounts for three-fourths of the total tonnage and 97 percent of the internal distribution costs.

As the variety of goods increases and as production becomes more specialized, the proportion of "small shipments" (500 pounds or less) in LTL (less-than-truckload) and LCL (less-than-freight-car-load) lots increases, particularly in local distribution. The unit costs and the relative share of the total national freight bill accounted for by these shipments in the CCMS countries (and in all

industrialized nations) have increased alarmingly in recent years in response to the high labor costs and the large number of vehicle miles required to pickup and deliver small shipments under our present institutions. For while goods typically flow into urban areas in bulk shipments along a few well-defined routes by means of sophisticated technology, and are trans-loaded at terminals which employ automated systems and data processing, they are all too often distributed in small trucks which operate one-half to three-quarters empty, which spend only one-quarter of their time actually in transit, which crisscross each others' paths and duplicate each others' routes, and which queue up behind each other at curbside to load or unload 50-100 pounds of similar merchandise. In performing their PUD (pickup and delivery) functions, they impose delays on each other and on passenger and pedestrian traffic, contribute to accidents, and create serious noise and air pollution. Even more critical at this point in time, they consume (or more accurately, waste) large amounts of energy. With the possible exception of Holland, present trends in virtually all countries for which data are available indicate that these trends are likely to continue.

This paper is concerned with one aspect of the urban PUD of small shipments: terminal operations. Specifically, it proposes that the terminal activity (breaking bulk, sorting, and consolidating) be moved off city streets and into specialized structures where it can be performed more efficiently and employ schemes which

will make better utilization of truck capacity, and reduce the number of truck trips, miles traveled, truck stops, and out-of-pocket and social costs.

TYPES OF CONSOLIDATION

Consolidation is the grouping or assembling of different shipments or consignments. The object is to minimize the transport and handling costs by moving freight from common origins to common destinations in lots which are of optimum size with respect to transport costs.

There are a large number of consolidation schemes possible. Although the schemes described here do not exhaust the list, they illustrate the main types.

1. Consolidation at city of origin or points en route. This alternative represents the greatest opportunity for intercity economies. A full truck (or freight car) load may be obtained by assembling shipments at one or more points in route. This may require a time delay. In some instances, a single shipper may be able to put together a truck-load for a single receiver (or in the case of several receivers in the destination city, for a local terminal). In St. Louis, Missouri, local cartage carriers have negotiated a master agreement with intercity carriers for pooling of pickups of local freight destined for receivers in other cities. One local truck picks up all the freight from a given shipper, and

distributes it to over-the-road truck lines, freight forwarders, and railroads, to which it has been consigned.

2. Consolidation at city of destination. This alternative can reduce the number of local distribution trips at the destination city. However, by itself, it cannot reduce the number of truck trips in the origin city, or between cities.

3. Local consolidated pickup and delivery. This alternative offers the greatest potential for reducing local PUD trips, and is the solution most frequently suggested. Figure 1 portrays the present pattern, where each shipper (1-4) dispatches freight to a number of receivers (A-D). The "rational" scheme would have each shipper send all of his consignments to a local terminal, where they would be sorted and combined with other shipments according to destination. Theoretically, one truck trip a day to and from each local shipper and receiver might replace several trips, at least in the case of small firms, and sharply reduce local transport costs. Thus, a study undertaken in Columbus, Ohio indicates that the number of regular PUD trucks entering the CBD (central business district) on a typical weekday could be reduced from 660 to 70 by means of a single consolidation terminal, as illustrated in Figure 2. A similar strategy has been recommended for New York City metropolitan area. In this case, 107 cluster terminals would handle PUD within local areas. Freight originating in Cluster I and destined for Cluster XVI would be routed through the respective terminals

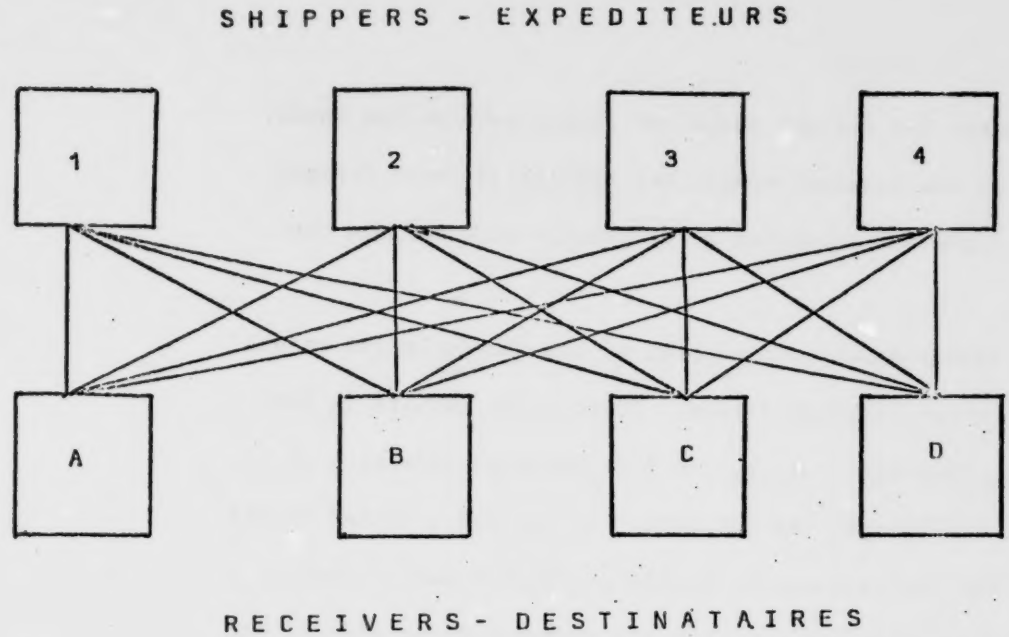

Fig. 1 : Existing pickup and delivery
(Système de livraison actuel)

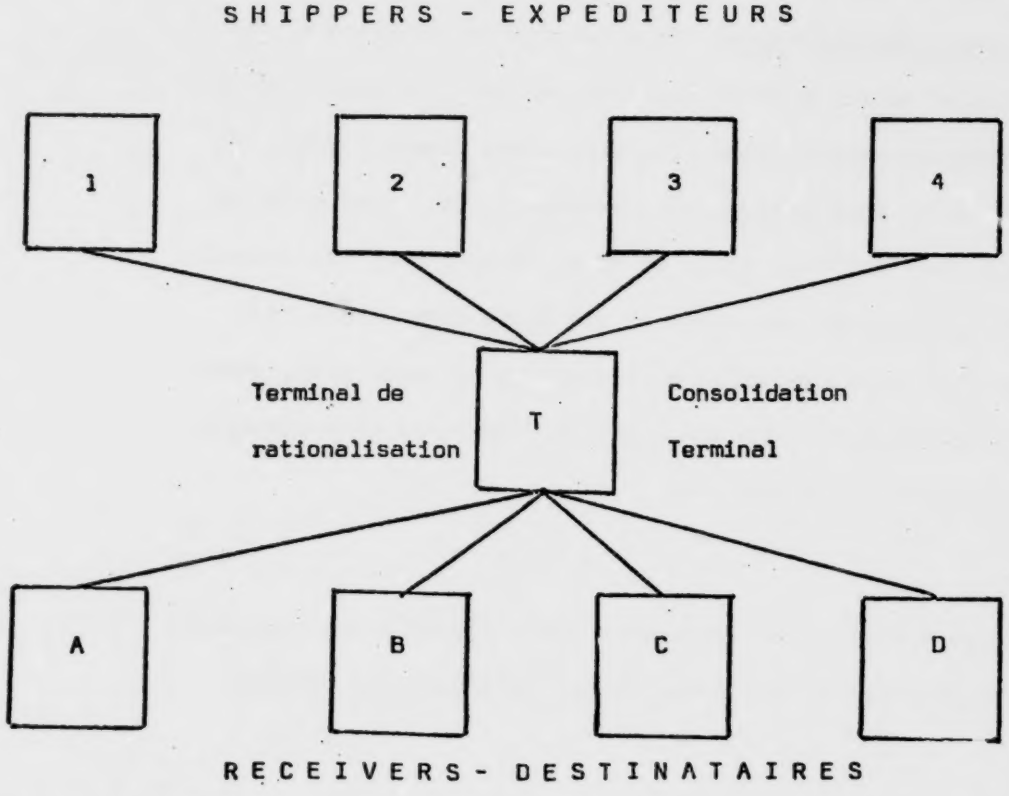

Fig. 2 : Consolidated pickup anddelivery
(Système de livraison rationalisé)

(and similarly for freight bound for points outside New York). Inclusive of the terminal costs, the savings in local freight transport alone was estimated to be roughly $100 million per year.

This approach has been adopted by the wholesale and retail grocers in three Canadian cities. Preliminary results in Vancouver have been encouraging, and have prompted extension of the scheme to Winnipeg and Edmonton. In the U.S., United Parcel Service (UPS) has developed a highly profitable small parcel business around this scheme. UPS has common carrier status, and provides both local and intercity service. It serves as a model for the evaluation of other endeavours.

4. Local route consolidation. This alternative consists of the coordination of multiple pickups and deliveries by a single shipper so as to eliminate duplication of travel along common routes. It is used for mail, milk deliveries, newspapers, etc. One study of air cargo in New York City found it to be cheaper than the consolidated terminal approach described in (3) above where there is a small number of carriers, where shipments are of small size, where consolidation terminal costs are high, and where the main terminal is not far from the PUD area.

ADVANTAGES

The cost saving from the elimination of truck trips--particularly local PUD--has already been cited. Consolidation schemes

offer the following additional benefits:

- because regional terminals are located on the urban periphery, large intercity trucks do not penetrate the urban core, thereby facilitating shorter turn-around times for these carriers and reducing traffic impedance and environmental impacts;
- consolidated terminals offer the opportunity for cost reductions from automation, standardization of shipping units, use of containers, and centralized rating, billing, routing and sorting.

PROBLEMS

Coordinated, area-wide freight consolidation schemes have been seriously proposed for many years, but to date apparently no city has attempted to implement such a scheme. The principal reasons for this appear to be the following:

- there has been insufficient incentive, especially since carriers view each other as competitors;
- carriers desire to maintain control of shipments, especially since shippers hold them responsible;
- much of local PUD is private, with the shipper providing his own delivery vehicles;
- in the case of brand names, the role of the truck and the driver has changed, so that the driver is now also a salesman, and the vehicle is also a mobile billboard;

- local or state economic or "public utility" regulations sometimes allocate routes and zones among carriers, prohibit "collusion", and otherwise impede this type of arrangement;
- labor unions fear the loss of jobs for truck drivers;
- scale effects, requiring that participation be widespread in order for a scheme to succeed;
- there are numerous practical difficulties which would have to be overcome or at least dealt with, for example incompatibility of certain items and certain types of services with respect to consolidation, weekly and seasonal variations in pickups and deliveries, and directional imbalances;
- reluctance of shippers and receivers to surrender any freedom of action (e.g., reducing the number of daily pickups or deliveries, and having to maintain larger inventories; and
- lack of an effective communication and decision-making mechanism for the principal actors (i.e., shippers, carriers, and receivers).

THE FUTURE OF URBAN FREIGHT CONSOLIDATION

Studies and the limited experience in the CCMS and other countries (e.g., Japan) indicate that substantial savings in out-of-pocket costs, external effects (traffic congestion and environmental impacts) and fuel may be achieved by carefully designed and

vigorously implemented freight consolidation schemes, especially consolidated urban PUD (alternative 3). There are a number of difficulties which must be overcome before area-wide consolidation would become a reality. While research will assist in overcoming these difficulties, the greatest hope lies in learning by doing. Where local terminals already consolidate intercity shipments (e.g., in Holland), it should be possible to apply the experience already gained to consolidating intraurban shipments, as UPS has done in the U.S.

The energy shortage is presently exerting strong pressures on carriers to come up with modes of providing local freight services with smaller expenditures of fuel. Cities probably will not be able to implement ambitious consolidation programs within a time frame which will materially relieve the present crisis (assuming it is a short-run crisis). However, the long-run implications of the energy picture appear to require a much greater degree of consolidation if we are to approximate our present levels of urban freight transport services. Now would appear to be the time for the CCMS members to undertake some bold initiatives and develop methodologies which may be shared with other countries. Hopefully, we can learn from one another.

D - Topic 4 : EFFECTS OF COMMERCIAL CUSTOM AND REGULATIONS AND OF PLANNING REGULATIONS

D.1-COMMERCIAL OBJECTIVES IN URBAN DISTRIBUTION

1. Any attempts to regulate or reorganize the urban distribution of goods needs to take account of the realities of the needs and motives of the owners and carriers of the goods. Urban delivery is only a part of the transport process, and transport itself is normally only a small-cost component of a total manufacturing or service supply. Considerations of optimality of the total often require that urban delivery operates under a series of constraints which make it very much more expensive than it need be. This may mean operating large vehicles with part loads; letting vehicles stand idle or covering unnecessarily long routes and repeated circuits of an area. Transport operators often consider that their primary function is to offer a service and are conscious that their competitiveness depends more on filling their customers' needs than quoting low prices.

   "The need to provide service is of course not sacrosanct if it conflicts with the general good. Regulation however will not be effective unless the motives driving the present operational system are clearly understood."

2. Service rather than economy remains the primary aim in urban areas even when the value of the goods moved are very low. Haulers engaged in the movement of spoil from civil engineering works (a zero

value commodity) are clear that their job is to see that accumulation of spoil does not interfere with progress of site work, and if this requires inefficient use of transport resource the customer is willing to pay for it. Similar observations are made by urban carriers of other low-value goods like sand and gravel.

3. In a recent survey of 52 organizations owning commercial vehicles in an urban area in UK for example only four indicated that low transport cost was a primary objective.

4. This "service first" concept implies that an urban carrier will often provide and expect to provide services other than carriage. Further he values the information gained by direct contact with his customers (even in own-account operations) at times of pick-up and delivery French authorities consider, for example, that the failure of carriers in the Paris region to make use of the urban delivery services provided by the government encouraged transhipment stations at Garonor and Sogaris is ascribable entirely to the desire for direct contact with the customer, though it may be that doubts about the quality of non-carriage services provided also played their part. Both in France and in Holland some success in organizing transhipment services of this kind has been achieved through hauler co-operatives, where the same objections may have less force (though the Dutch success is probably influenced by a rather restrictive common-carrier licensing system). Observations in Moscow suggest that information carried by drivers about needs and availability of goods on the following

day are a valued part of the operational information needed by the management of haulage collective.

5. Besides additional service functions, both carrier and shipper or receiver carry out certain more on less necessary commercial and inspection functions at the time of pick-up and delivery. At the very least, packages delivered have to be counted, and a receipt passed. In many countries signatures of both parties on multi-copy receipts are required in law, and even if they are not common commercial prudence requires both parties to address their minds to the question of whether a consignment is complete and undamaged and to record this. Should the consignee and consignor be in different countries, several legal systems may be involved-- in such cases notwithstanding recent standard documentation schemes the complexity may be very great. In UK, insurers often claim the right to refuse to entertain claims for damage in transit if goods are signed for "unexamined", so an uncrating and inspection process may be needed. Yet other complications arise when payment at times of pick-up or delivery is customary.

D-2-FUNCTIONS CARRIED OUT AT DELIVERY

6. Perhaps the complexity of service, inspection and payment functions which are customary in various trades and countries is best illustrated by example. Besides driving trucks haulers may have to:

(A) Provide the following services

1 - Deliver to elevated floors or cellars (France, UK. - beer)

2 - Arrange goods on counters for sale (France, US, UK - Food)

3 - Collect empty boxes (all countries) or goods taken in part exchange (UK. furniture, cars)

4 - Supply expert delivery (as part of contract) of easily damaged goods (UK - glass, lift cables)

5 - Collect and deliver within-company mail (UK - pharmaceuticals)

6 - Make use of refreshment and toilet facilities (general, but very common in UK - tea, and in brewery trade).

(B) Carry out inspections

(1) Make up orders at point of delivery either because this is carrier policy or because order is not settled till vehicle arrives (UK, Bakery; France, dairy products)

(2) Offer goods for inspection before acceptance (US,UK, France - fruit and vegetables).

(C) Collect payments, etc.

1 - Cash-on-delivery trade (all countries)

2 - Accept payment for carriage (France - "port dû")

3 - Accept payment for additional goods sold at time of delivery and unloaded at once (UK - coal, wholesale food)

4 - Accept payment for goods hawked to the general public (all countries - ice cream, US - fruit, France - general)

5 - Accept orders, (and actively seek sales) for further deliveries (all countries - wholesale food, UK - clothing and textiles).

7. In France, where the delay caused by parked commercial vehicles is a dominant concern the following measures have been proposed to reduce these activities.

1 - Prohibition of delivery other than to ground floor (the report calls this "theoretically forbidden" now).

2 - Tax reductions and other incentives for lifting tail gates or provision of hand trolleys.

3 - Tax on consignees who pay on delivery.

4 - Regulations forbidding many practices mentioned above.

5 - Tax on carriers who order-pick in vehicles

6 - Tax on small parcels.

Certainly it is not unusual to observe that no more than 20% of the time a vehicle is stationary is consumed by the delivery itself (ignoring waiting time), the rest being taken up in service, office and commercial activities.

8. However, many of these practices represent possibly socially undesirable, but cheap, ways of carrying out functions necessary to a commercial transaction. "A balance must be struck between the cost of changing the way in which these things are done and the levels of benefit achieved. It should also be realized that this is an area in which the distribution of costs and benefits may be socially regressive. For example prohibition of cash sales. . ." Further, prohibition of cash sales of unordered food and coals might strike particularly heavily the old, poor and confused who are not familiar with banking practices or are for other reasons unable to

anticipate their needs or obtain credit. No analysis of the extent of these practices exists, and it might be unwise to make decisions in the absence of knowledge of the social and commercial (and political!) effects of the alternatives. These remarks may indicate a research need not previously expressed.

D-3-EFFECTS ON PLANNING

9. The land needs of goods movement are rarely expressly taken account of in urban planning. Vehicles do need to be stored somewhere however, and this location must be accessible to their drivers and not too distant from the shops and warehouses they serve. Such vehicle depots are not thought of as good neighbors, especially in residential areas. The alternative overnight street parking of commercial vehicles is probably even less acceptable. Solutions here will never be easy, but an urban plan which does not recognize goods transport as a specific land use with its own requirements for access to the street network is not likely to find them.

10. New developments of industrial or commercial centres normally attempt to make good provision for goods collection and delivery, often with special arrangements for security. In practice this does not always work as expected, because the peak arrival rate is greater than anticipated, because the capacity of the design is less than supposed or because employees and managers use the goods area to park their cars. There is in fact little to guide the designer either about the peaking factors needed or about the area needed to handle a given set of operations especially when several organizations are

involved. In older development it not infrequently happens that loading/unloading areas become extremely cramped at present rates of activity, besides being sometimes too small to admit vehicles too large to be drawn by horses.

11. Reserved lanes for buses often produce some conflicts with loading and unloading operations, particularly for contra-flow lanes, or if it is desired to separate the bus lane physically for the rest of the road. In pedestrianized streets conflicts are even more pronounced. In both cases failure to find satisfactory solutions for goods access even for one or two shops only not infrequently results in major delay or abandonment of large reserved way schemes. More frequently the need of one or two premises for access from the bus lane or pedestrian street has resulted in a general dispensation being given to goods vehicles to load and unload at certain times of day, and observation then shows that this is used by premises which do have rear access. In part this arises from the lack of capacity of many rear access arrangements already referred to.

12. Further the specific relaxations granted in industrial areas are diverse and present a total picture of great complexity. Signing practice varies between countries, as do the ranges of permitted hours. Some harmonization through the existing international organizations would perhaps be worthwhile. A more effective line might be to improve understanding of:

    1. the demand for off-street loading and unloading, particularly in rear areas.

2. the capacity of various layouts to accept it.
3. the possibilities of regulating the use of such areas for purposes other than loading and unloading.
4. the possibility of limiting the dwell time of vehicles in such areas by scheduling of arrivals (as is done in ports) and regulation of the practices mentioned in paras. 4-7 above.
5. the legal possibilities of granting exemptions in the pedestrianized areas to vehicles requiring the access to certain premises only.

In addition, conditions in pedestrianized areas to which goods vehicles must be admitted would be improved if highway codes were such that drivers in these areas behave like privileged trespassers, giving priority to pedestrian movements in the same spirit as pedestrians yield to vehicles when crossing an arterial road.

TOPIC 5: RESEARCH, DEVELOPMENT AND DEMONSTRATION

INTRODUCTION

"Urban Goods Movement" (UGM) is being given a broad interpretation: the transportation of, and terminal activities associated with, the movement of things as opposed to people in urban areas. It includes movement of things into and out of the area as well as within the area by all modes, including the transmission of electricity to the extent that it relates to the transportation of fuels, pipeline movement of petroleum, water and waste, the collection and movement of trash and mail, service truck trips, and even some person trips which involve substantial goods movement such as shopping trips (which constitute 15 percent of auto trips in the U.S.).

"The UGM problem" has many components, e.g., rising physical distribution costs, congestion, accidents, air and noise pollution, pavement wear, cargo loss and theft, and excessive energy consumption. Thus, while there is no single UGM problem, it is becoming increasingly clear that the same transport services could be performed with a smaller sacrifice of the communities' resources (or alternatively, more and/or better UGM services could be produced with the amounts of resources presently used). In the U.S. and in other countries, numerous indicators bear this out, e.g., the faster growth rates of truck miles and trucking expenditures

relative to auto in many cities, increasing costs of small shipments (to the point that most for-hire carriers are now trying to avoid them), and the increasing proportion of GNP accounted for by urban trucking during the past decade (while intercity trucking's relative share of GNP has decreased).

Since the turn of the century there have been many improvements in intercity transport, for example, pipelines, the unit train, containers, air freight (especially since the advent of the jumbo jet), and the super-tanker. However, following the advent of the motor truck, the technology of urban freight transport has practically stood still, and there has been little progress in making better use of this technology. And while the truck has served to free industry and commerce from close proximity to water and rail, as an innovation, the truck was a change of degree more than of kind, since basically it replaced the horse with the internal combustion engine as the source of power, with the vehicle still consisting of a box riding on four (or more) wheels.

The following sections and the accompanying table suggest a range of improvements which are possible during different time periods. All of the alternatives have one goal: to reduce the public and private costs of transporting freight within cities.

SHORT-RANGE IMPROVEMENTS

There are a number of improvements which can be accomplished in approximately a year or less by better management and administration of the existing transportation system. (See Items 1-10 on the chart.) For example, some cities have arranged for most truck pickups to take place in the morning, and delivery in the afternoons. Certainly, efforts can be made to minimize conflicts with peak-hour traffic. Where rescheduling is successful, driver and vehicle time per consignment is reduced; there is less congestion from interference with other traffic, and less air pollution, energy consumption, and possibly noise per operation. There also may be less accident exposure, since the rate of accidents per million vehicle miles for trucks in urban areas is greater than for automobiles. The same considerations apply to evening deliveries. Some chain stores prefer to deliver after normal hours. In order for this to be successful, there must be participation from a sufficient number of stores to make it worthwhile. Although one experiment -- London's "Operation Moondrop" -- demonstrated that this may not always be feasible, the increased costs of daytime deliveries as a result of queues and delays will make this alternative more attractive, particularly if secure "key rooms" or containers are available for drivers to leave the consignments.

Other alternatives which may be implemented in a year or less include:

(2) traffic engineering to improve flows of all vehicles, or to reserve certain traffic lanes for truck use part of the day;

(3) auto-free zones with exclusive access for PUD (pickup-and-delivery), emergency, and public transportation vehicles;

(4) shutting off engines during delivery or pickup to reduce air pollution, noise and fuel consumption;

(5) prepaid shipments to save 5-10 minutes per consignment;

(6) use of taxicabs, where appropriate, to integrate small shipment PUD into their operations (e.g., when "cruising");

(7) dial-a-truck similar to the "dial-a-ride" concept for passengers;

(8) improved route scheduling to reduce the distance a truck must cover to serve a particular group of customers;

(9) improved route consolidation to reduce the number of trucks required to serve a given area; and

(10) economic incentives (e.g., road pricing) to increase the price of travel in congested areas during certain hours of the day, and thereby encourage a number of other alternatives proposed here (e.g., improved routing, scheduling, and consolidation).

INTERMEDIATE-RANGE IMPROVEMENTS

Another group of alternatives can be implemented in a somewhat longer period of time (e.g., 1-3 years), but do not require the type of planning or capital improvements necessary to construct new rights-of-way. These include:

(11) better use of containers to speed shipments from manufacturer to retailer and to reduce the time and costs required for physical handling, loading and unloading, sorting, etc.;

(12) simplified documentation involving simpler and standardized forms to reduce the time and "red tape" in shipments (ideally, the form would be applicable to different types of shipments, and to intercity as well as local transport);

(13) elevator improvements to increase the capacity and speed of operation of elevators, and thereby reduce waiting times for drivers and queues of vehicles;

(14) dock changes to accommodate trucks of different size and height (e.g., by installation of a platform which can be elevated to different heights);

(15) consolidation terminals to achieve coordinated PUD (e.g., as presently practiced by United Parcel Service in the U.S.); and

(16) better integration with other transportation systems (e.g., use of rail in place of trucks to transport mail and packages between airports and post offices, and to transport solid waste out of the central city).

LONG-RANGE IMPROVEMENTS

Finally, there are improvements which require construction of new rights-of-way or of new systems, or major modifications in existing systems and which consequently require a long-range perspective, i.e., 3-5 years as a minimum, and in some cases 10-20 years or more. Such improvements include:

(17) improved urban design to better provide for freight flows (e.g., a new town planned as a satellite city for Prague) and designed to minimize freight costs by means of automated distribution systems linking households to retail outlets;

(18) improved building design to include solid waste disposal systems (e.g., in Sweden and Disneyland, Florida) and underground (or at least off-street) truck docks;

(19) improved truck design to meet the special requirements of urban PUD (e.g., an electric engine to improve fuel economy and reduce noise and air pollution, greater security against theft and hijacking, a configuration and turning radius compatible with urban conditions, and innovations in carousel container systems to facilitate locating shipments on the vehicle, loading and unloading);

(20) new systems designed exclusively for freight (e.g., automated underground systems or pneumatic tubes of the type used to transport mail in Paris and London), or for joint use of passengers and freight (e.g., Personal Rapid Transit with interchangeable freight

or passenger vehicles, with the network laid out explicitly to serve both types of demand); and

(21) communications technology advances to improve communications between shippers, carriers, receivers and urban traffic control centers; to reduce the numbers of person trips (and the induced freight flow); and to reduce the flow of printed media which requires physical movement.

CONCLUSION

Apparently UGM has received less innovative thinking than any other field in transportation. Recent research strongly suggests that substantial economies can be achieved by putting to use what we already know to make better use of the vehicles, terminals and streets which constitute our present systems. The energy crisis -- which apparently will be a long-run phenomenon -- provides powerful incentives to implement many alternatives which should already have been adopted for reasons of economic efficiency. Substantial improvements in efficiency and fuel economy can be achieved in the short-run by reducing the number of truck trips and duplication of routes by improved routing and scheduling, and use of taxicabs and a demand-responsive vehicle (dial-a-truck). In the intermediate period, freight consolidation shows promise of reducing urban PUD truck trips by half or more -- particularly if combined with better use of containers. In the long-run, vehicles, buildings and cities should be planned with greater attention to the particular requirements of freight transport.

More exotic RD&D may make significant contributions -- particularly in the development of new types of vehicles for the urban environment. However, the greatest need is to be more innovative in applying our present know-how in the near-term.

TAXONOMY OF URBAN GOODS MOVEMENT IMPROVEMENTS

Improvement	Potential Benefits									Implementation Costs	Constraints
	Freight Cost Savings	Time Savings	Reduced Congestion	Reduced Pollution	Reduced Noise	Improved Aesthetics	Energy Savings	Reduced Loss & Theft	Improved Safety		
Short-Range (1 year or less)											
1. Rescheduling PUD											
a. Daytime	Yes	Yes	Yes	Yes	No	No	Yes	?	?	Minimal	Sufficient acceptance and participation
b. Evening	Yes	Yes	Yes	Yes	No	No	Yes	?	?	Minimal	
2. Traffic Engineering (e.g., truck lanes)	Yes	Yes	Yes	Yes	?	?	Yes	?	Yes	Minimal	Sufficient acceptance and participation
3. Auto-free Zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	Minimal	Acceptance and coordination
4. Shutting off engines during PUD	Yes	No	No	Yes	Yes	No	Yes	No	No	None	Condition of vehicle (sometimes hard to start)
5. Prepaid shipments	Yes	Yes	Yes	Yes	---	No	Yes	?	No	None	Willingness of consignees
6. Use of taxicabs for PUD	Yes	?	Yes	Yes	Yes	No	Yes	?	Yes	Minimal	Sufficient acceptance and participation
7. Dial-a-Truck	Yes	?	Yes	Yes	Yes	No	Yes	?	Yes	Minimal	Sufficient acceptance and participation
8. Improved Route Scheduling	Yes	?	Yes	Yes	?	No	Yes	?	Yes	Minimal	Sufficient acceptance participation and methodology
9. Improved Route Consolidation	Yes	?	Yes	Yes	No	No	Yes	?	Yes	Low	Sufficient acceptance participation and methodology

--Continued--

TAXONOMY OF URBAN GOODS MOVEMENT IMPROVEMENTS

Improvement	Potential Benefits									Implementation Costs	Constraints
	Freight Cost Savings	Time Savings	Reduced Congestion	Reduced Pollution	Reduced Noise	Improved Aesthetics	Energy Savings	Reduced Loss & Theft	Improved Safety		
Short-Range (1 year or less) cont'd											
10. Economic incentives (e.g., road pricing)	Yes	?	Yes	Yes	?	No	Yes	?	Yes	Low to high	Political acceptability
Intermediate Range (1-3 years)											
11. Better use of containers	Yes	Yes	Yes	Yes	?	?	Yes	Yes	Yes	May be high	Agreement on standard container size, acceptance of principle
12. Simplified documentation	Yes	Yes	Yes	?	?	No	?	?	?	Minimal	Agreement to simplify paperwork and to accept standard form
13. Elevator	Yes	Yes	Yes	?	No	No	.	.	.	Modest to high	Building design
14. Dock changes to accommodate all truck sizes	Yes	Yes	Yes	?	No	No	No	?	?	Moderate	Lack of interest
15. Consolidation terminals, coordinated PUD	Yes	Yes	Yes	Yes	Yes	?	Yes	?	?	Moderate to high	Requires high degree of cooperation among groups which usually see each other as competitors

--Continued--

TAXONOMY OF URBAN GOODS MOVEMENT IMPROVEMENTS

Improvement	Potential Benefits									Implementation Costs	Constraints
	Freight Cost Savings	Time Savings	Reduced Congestion	Reduced Pollution	Reduced Noise	Improved Aesthetics	Energy Savings	Reduced Loss & Theft	Improved Safety		
Intermediate Range (1-3 years) cont'd											
16. Better integration with public transportation	Yes	?	Yes	Yes	?	?	Yes	?	?	Low to high	Acceptance, willingness to implement; in some cases, major physical changes may be necessary
Long-Range (3-5 years or more)											
17. Improved urban design	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High (but probably no higher than conventional cities)	Acceptance and effective collective action; long time horizon
18. Improved building design	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High (but probably no higher than conventional cities)	Acceptance and effective collective action; long time horizon
19. Improved truck design	Yes	Yes	Yes	Yes	Yes	?	Yes	Yes	Yes	Possibly high for prototype	Obtaining agreement on specifications, getting produced, and gaining general acceptance

--Continued--

TAXONOMY OF URBAN GOODS MOVEMENT IMPROVEMENTS

Improvement	Potential Benefits									Implementation Costs	Constraints
	Freight Cost Savings	Time Savings	Reduced Congestion	Reduced Pollution	Reduced Noise	Improved Aesthetics	Energy Savings	Reduced Loss & Theft	Improved Safety		
Long Range (cont'd)											
20. New transportation systems; a. freight	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Capital costs rather high	Obtaining agreement on specifications, getting produced, and gaining general acceptance
b. Passenger and freight	Yes	Yes	Yes	Yes	?	?	Yes	?	?	Modest for bus, large for rail, but could be shared with passenger	Commitment to present system. Some incompatibility between passenger and freight movements
21. Greater use of communications technology	Yes	Yes	Yes	Yes	?	?	Yes	?	?	Possibly high threshold costs	Acceptance and effective collective action: long time horizon

NATO/CCMS: URBAN GOODS MOVEMENT PROJECT

F - Topic 6: COORDINATION OF STUDY METHODS

F1 - A study of freight movement is likely to involve two types of classification:

a) of commodities carried

b) of type of vehicle used

In both cases a great many choices are possible. This note sets out the basic needs of any classification and points out the necessity for compromise in a practical situation. In each case, four conflicting principles arise:

1. The classification should be sufficient for the immediate purposes of the study, without involving excessive additional costly collection and processing of data which are not needed for this purpose.

2. The information collected shall be compatible with that produced in other studies and routine statistics.

3. It shall be possible to collect the information needed by the means envisaged; e.g., if the commodity is to be determined by asking the lorry driver what he is carrying, he may well know it is stone without being able to distinguish between Dolomite, crude (SITC 27623) and Tufa, calcareous (SITC 27313). (He may not be alone.)

4. Divisions of legal significance should be adhered to; e.g., Parisian law distinguishes between vehicles of street area of under 10, 10 to 16, 16 to 25, and over 22.5 square meters. These ranges are preferable to the more "scientific" but less applicable ranges divisible by 5.

F2 - At least eight classifications of commodities are used for various national and international purposes. They can roughly be divided into two classes--those designed for tariff, customs and industrial economic purposes, and those designed for transport. All are tiered systems in which goods are classified into general chapters, at a one or two digit level and go on to subdivide very elaborately. The classifications are:

A - Transport classifications

1 - CSTE Classifications des marchandises pour les Statistiques de Transport en Europe. Prepared by Inland Transport Committee of EEC. Similar to both SITC and BTN.

2 - NST Nomenclature uniforme de marchandises pour les Statistiques de Transport. Compiled by the Statistical Office of the EEC. It has the same (3 digit) headings as CSTE but a different structure.

3 - TCC Standard Transport Commodity Code. Widely used in USA, in particular by Tri-State Commission.

B - Industrial classifications

1 - SITC Standard International Trade Classification, prepared and used in the United Nations and in general economic studies.

2 - BTN Brussels Trade Nomenclature. Used in EEC for customs purposes.

3 - NCM Nomenclature uniforme des Chemins de fer pour Marchandises. Used by UIC for international tariffs, etc.

4 - CCNR Central Commission for Navigation on the Rhine. Classification for presentation of statistics.

5 - An 82-category classification developed for input-output tables by U.S. Dept. of Commerce.

F3 - The industrial classifications, especially SITC are the most widely used. They tend to be of little use in transport studies since they classify industries rather than goods. In Europe the clash between CSTE and NST is unfortunate, but the UK Department of the Environment has produced a 24-category classification of which the chapters of both NST and CSTE are subsets. In practical freight studies, it is necessary to add at least three other categories:

a) Mixed loads

b) Empty vehicles

c) Empty boxes, containers or pallets

The resulting 27-category grouping is experimentally satisfactory, in that each load can be categorised with minimal error by relatively

untrained coders based on information from vehicle drivers or commercial waybills. The compatibility of this with TCC is unknown.

F4 - The important characteristics of road vehicles are normally:

a) Gross weight or maximum permitted weight

b) Length

c) Width

d) Height

e) Number and pattern of axles (including trailer and semi-trailer details)

f) Body type

g) In UK, unladen weight. (The UK practice of licensing vehicles according to unladen weight is already supplemented by the vehicle "plate" giving a maximum permissible "all-up" weight, and may disappear under EEC harmonisation policies).

h) In France, surface area.

All of these may have legal significance. It is rarely possible to collect information on all of them. Experience indicates that correlations between them, though good, are imperfect and if, for example, vehicle width is of real concern in a study, it needs to be measured directly. Further, errors in measurement in the field can be large and vehicle dimensions tend to be grouped, especially just below legal limits. The ranges in terms of which results are to be expressed must be defined at the outset and measurements taken directly into them.

F5 - The legally significant divisions are probably more significant than compatibility between different international studies. Consequently, compatibility between studies in countries using metric and imperial units will not be obtained. However, within the metric or imperial systems it could be useful to recommend bands of width, height, length, area and weight measurements which might be used internationally. Classifications of axle patterns have been made by the EEC.

F6 - Rail vehicles are of a more standardised nature and the corresponding problems do not arise (although standard trucks do vary between the North American, European and UK systems, and to some extent within them).

Finally, there are a group of descriptors which describe the legal character of the operator, his operation and its place in the chain of distribution. One has the impression that variations in legal system and commercial practice in different countries are sufficiently wide for a generally applicable standard classification here to be unobtainable. It would, however, be worthwhile collecting statements about the different kinds of operation and operator which are distinguished in law and commercial practice in different countries in order that parallelisms could be understood.

CONCLUSION

1) It would be useful to examine the practice of research workers in different countries with regard to classification of commodities to see if common categorisation can be arrived at. The UK CSTE/NST derivation may be a useful starting point, especially if it can be made compatible with TCC.

2) A similar exercise on banding of dimensions will be complicated by differences in legal barriers. It could be valuable to list and compare various legal limits in different countries, and see if any common system can be recommended.